COMMENTS OF THE MARSHALL ISLANDS PROPOSED MEDICAL MONITORING AND TREATMENT LEGISLATION

Section [ ]a

The determination of whether or not additional the people of those atolls (Ailuk, Likiep, Wotho, Bikini and Enewetak) should be included in an expanded medical monitoring and treatment program might best be approached by a review of the projected level of dose received and the possible incidence of health related disease that can be attributed to such exposure.

The Compact of Free Association, Public Law 99-239, included the people living at Rongelap and Utirik at the time of the 1954 nuclear fallout from Test Bravo. The Rongelap people received a high acute external whole body acute dose of about 175 rem with calculated internal thyroid dose from short-lived radioiodines ranging from about 600-4000 rads in children and about 1300-1700 rad in adults. Total cumulative lifetime dose the people (dose received over 50 years) was based on early aerial monitoring surveys and was estimated at about 202 rem. The prevalence of thyroid nodular disease at Rongelap ranges from 13-81 percent with the higher prevalence seen among those exposed to high doses as a child.

The people of Utirik received an external whole body acute dose of about 14 rad. Utirik children received an average thyroid dose of about 100-500 rads and Utirik adults had an average thyroid dose of about 170-220 rads. Total whole body cumulative lifetime dose for the people of Utirik, based on early aerial monitoring surveys, was estimated at about 24 rem. The prevalence of thyroid nodular disease at Utirik ranges from about 7-12 percent with the higher prevalence seen in adults, the prevalence being higher in adults rather than in children.

These doses were significant, especially to the thyroid, and have resulted in hypothyroidism or thyroid cancer. The slow growing thyroid cancers were removed early with no resultant death of patients. The medical followup program was created to provide medical care and followup for these individuals with significant dose to ensure they receive the medical care they so rightfully deserve..

The Government of the Marshall Islands (RMI) assumptions in this section, is that people exposed to long-term chronic dose from residual fallout while living back on contaminated atolls or while living on atolls not evacuated have the same level of radiation related disease.

The external dose from fallout from Castle Series tests for the first year after these tests for the peoples of Ailuk, Likiep and Wotho, have been estimated to be 6.140 rem for Ailuk, 2.196 rem for Likiep and 0.784 rem for Wotho. It is estimated that the average thyroid dose to the youngest children at Ailuk was about 212 rad with adults receiving an average thyroid

dose of about 56-59 rad. The youngest children of Likiep received an average thyroid dose of about 69 rad with adults at Likiep received an average thyroid dose of about 17 rad. These doses are about a factor of 76 times less than those doses received acutely by those living at Rongelap and about 30 times less than that at Utirik Atoll at the time of the fallout from Test Bravo.

Adding the long term chronic dose from living in these residually contaminated environments represent a whole body dose that is not likely to exceed of 20 rem for a total lifetime dose on the Ailuk Atoll, the atoll out of these three that would have experienced the highest of the fallout related doses. As a comparison, the people of the United States receive and average background dose of about 300 mrem/year from terrestrial, cosmic and radon exposure. For a 50 year lifetime dose this accumulates to a total of 15 rem which is not significantly different from the dose at Ailuk.

If Congress expands the populations covered to those exposed to these chronic doses, the communities of Rongelap and Utirik would also insist that all those not part of 253 initial Rongelap and Utirik "exposed" acutely to the Bravo fallout doses, (i.e., the remainder of both populations) should get the same consideration as groups such as Bikini and Enewetak if medical coverage is expanded to other groups..

The Bikini and Enewetak people were evacuated prior the nuclear testing that occurred at their respective atolls and were not therefore exposed to early acute fallout through the end of the atmospheric nuclear testing era which ended in 1958 in the Marshall Islands.

When the Bikinians returned to their atoll, not all returned. For that segment that did return and live on Bikini the some 9 years, their dose from residual contamination would not have likely exceeded an average of about 1.0 rem per year and likely average more like 0.6-0.85 rem/year. Even at 1.0 rem/year average for 9 years, the cumulative dose would not have likely exceeded about 10 rem. For Bikinians living at Kili Island, average annual dose from residual fallout dose from global fallout radiation is about 0.3 millirem/year and would not likely exceed 2.5 millirem/year even among those eating a 75 percent local food diet along with 25 percent rice. This includes external plus internal dose from cesium-137. Assuming 3.0 millirem/year for the other 41 years that make up a lifetime dose, the 50 year lifetime dose for Bikinians remaining at Kili would be the combination of the 10 rem for the 9 years plus 41 years times 3 millirem/year. This would result in a 50 year lifetime dose of 10.123 rem.

For those of the Bikini population at Kili who might return to Bikini to live, their annual dose would likely average about 820 millirem/year on a primarily local food diet and could be about 250 millirem/year for those who choose to eat only 18 percent local food and who rely more on imported foods. Thus the dose at Bikini could run from doses similar to those for individuals in the United States to about 3 times that in the United States for those who rely on mostly local food.

The Enewetak people resettled Enewetak Atoll in 1980. For the past 16 years, it has been estimated that average dose to the population is about 1.5 millirem/year with a maximum based on eating primarily local food of about 5 millirem/year. The accumulative dose for the past 16 years from global fallout radiation which includes external plus internal dose from cesium-137 would be about 80 millirem. The U.S. population during this same time-frame received from natural background about 4800 millirem for the some 16 years..

Radiation doses to the thyroids of the exposed individuals in the mid-belt atolls (i.e. Ailuk and Likiep) are approximately 10-25 percent of those doses at Utirik. The incidence of thyroid nodular disease at Ailuk according to a mid-1980 study of approximately 7000 Marshallese was about 5 percent. Incidence rate at Likiep was about 10 percent and that at Wotho was about 9 percent. The prevalence of thyroid nodular disease in the comparison population, with no appreciable exposure, is 3-8 percent. Current ultrasound technology permits a detection rate for thyroid nodules of some 30-40 percent even here in the United States. About 10-15 percent of such nodules ever become enlarged thyroid tumors that alter thyroid function or develop into cancer. About 2 percent of the Utirik population has developed thyroid cancer to date. The lower doses at Ailuk and Likiep would likely represent the same or even smaller incidence, but this population has not been as closely followed.

Average Cost Per Patient/Year for the Current DOE Program

The current Department of Energy Marshall Islands Medical Program is expending about $2.5 million per year. This program provides full medical care for the 133 remaining Rongelap and Utirik population exposed to the high acute fallout doses from Test Bravo. In addition, approximately another 65 out of the some 109 that make up the comparison population are also provided medical examinations and care during the two medical missions to the Marshall Islands each year. That is a total of about 200 patients/year. Many of the 133"exposed" population are seen twice each year making the number of examinations higher. The cost to treat includes all the logistical costs of bringing physicians, equipment, medication, supplies to the Marshall Islands, associated medical examination costs, hospital laboratory testing, radiology services, ultrasound services, surgical services and the cost of travel, escorts and treatment at Straub Clinic in Honolulu, Hawaii for all tertiary care requiring diagnostic and medical attention and procedures not available in the Marshall Islands.

Cost Per Patient of DOE Program $2,500,000/200 patients = $12,500/patient/year

1986 Compact Allocated Cost/Patient/Yr. for the 177 Heath Care Program (Originally planned to serve 3500 patients with $2M/year)

1986 Cost Per Patient/177 Health Care $2,000,000/3500 patients = $571/patient/year

1996 Cost/Patient/Yr. for the 177 Heath Care Program (Now servicing 11,470 patients with the same $2M/year)

1996 Cost Per Patient/177 Health Care $2,000,000/11,470 patients = $174/patient/year

U.S. Anticipated Cost/Patient as minimum floor for healthy young adult (Pacific medical care delivery per Straub Clinic in Honolulu - logistic costs to get patients to and from treatment is not included)

1996 Standard Young Adult/Cost/Patient/Year $2,000/patient/year

U.S. Anticipated Cost/Patient as minimum floor for elderly adult (Pacific medical care delivery per Straub Clinic in Honolulu - logistic costs to get patients to and from treatment is not included)

1996 Standard Elderly Adult Cost/Patient/Year $5,000/patient/year

Population Size of Atolls Being Considered for Inclusion in the a Medical Care Program (Rough estimates without specific population statistical data) Population growth anticipated at about 5 per cent increase per year.

Ailuk	700 inhabitants
Likiep	900 inhabitants
Wotho	300 inhabitants
Bikini	2245 inhabitants
Enewetak	1255 inhabitants
TOTAL INHABITANTS	**5400**

Anticipated Cost for 5400 additional Marshallese (Assuming Average Cost/Patient/Year = $4500

Total Add-on Medical Costs/Year $4500/patient/year X 5400 Marshallese $24,300,000
(Note: Bikini and Enewetak Only $4500/patient/year X 3500 = $15,750,000)

Medical Referral Cost
About 20% of patients seen need referrals 5400 X 0.2 = 1080 patients $2,592,000
Logistics each referral $2000 X 1080 patients = $2,160,000
Every fifth patient needs escort, $2000/escort X 216 patients per year = $432,000

Cost of Construction of a Medical Treatment Facility/Majuro $3,000,000
(Ebeye Hospital cost $3,000,000 in 1994 dollars and it is assumed that RMI will complete this facility and it will be available for use)

Facilities Maintenance and Operation/Electricity/ $765,000
Supplies/Pharmaceutical/Year (these are only estimates and would need considerable refinement)

Pharmaceutical - $120,000 annually x 2 facilities	240,000
Lab Analysis - $85,000 annually x 2 facilities	170,000
Radiology costs - $65,000 annually x 2 facilities	130,000
Air Conditioning - $15,000 annually x 2 facilities	30,000
Electricity - $7,000 annually x 2 facilities	15,000
Transportation of PHS physicians $180,000 annually i.e. air fare, per diem, lodging etc.	180,000

Cost of Equipment Maintenance/Upgrading/Operation/Year (these are only rough estimates and would need considerable refinement)			$250,000
Replacement of Equipment/Spare Parts			
Technician salaries			
Purchase of new equipment			
Shipment of equipment			
Staff to Man Two Medical Treatment Facilities/Year			$692,000
2 Chief of Staff at Majuro and Ebeye -	$120,000 ea	$240,000	
6 physicians at Majuro and Ebeye -	$45,000 ea	270,000	
2 administrators at Ebeye and Majuro -	$25,000 ea	50,000	
4 staff nurses at Ebeye and Majuro	$15,000 ea	60,000	
4 laboratory Technicians	$10,000 ea	40,000	
4 record clerks	$8,000 ea	32,000	

TOTAL ANNUAL COST/EXPANDED PROGRAM (5400 PATIENTS) $28,599,000
(With an additional initial Majuro Milcon Cost of $3,000,000)

COST TO MAINTAIN HIGH QUALITY DOE PROGRAM

If the same high quality care for the 133 Rongelap and Utirik patients plus 65 comparison patients/year is applied to the additional atoll populations considered (this includes logistics costs to get patients to and from treatment facilities:

Ailuk, Likiep, Wotho, Bikini and Enewetak
Add 5400 patients X $12,500/patient = $67,500,000/year

<u>Quality Program Attainable at $4500/patient</u>

Bikini and Enewetak Only
Add 3500 patients X $12,500/patient = $43,750,000/year

Bikini and Enewetak Only
Add 3500 patients X $4,500/patient = $15,750,000/year
Plus Logistics and Referral Costs
$2000/patient for 700 referrals $1,400,000/year
$2000/escort for 140 escort trips <u>$280,000/year</u>
Total $17,430,000/year

COST TO SUPPLY MEDICAL CARE TO CURRENT 11,470 PATIENTS IN THE 177 HEALTH CARE PROGRAM PLUS THE ADDITIONAL 4500 PATIENTS FROM THE NEW ATOLLS (MINUS LOGISTICS COSTS)
(Note: 3500 Enewetak and Bikini patients are already part of 11,470 but are only covered at an average of $174/patient)

11,470 + 1,900 NEW PATIENTS = 13,370 PATIENTS
13,370 PATIENTS x $4,500/PATIENT = $60,165,000/YEAR

National Academy of Sciences (NAS) Independent Medical Review
(Projected Costs are not backed by any proposal to date)

Cost dependent on scope and charge of the Medical Review yet to be provided to NAS and is not available with current funding which allows for operational medical care delivery for approximately 200 patients and the environmental monitoring and dose assessment activities carried out on behalf of the people of the Marshall Islands)

Previous Rongelap Radiological Safety Review (1992-1995)	$800,000 over 3 years
Forward Approach NAS Independent Review (Minimum)	$1,200,000 over 3 years
Total Review of All Past Programs Country Wide	$2,000,000 over 3 years

Percent of Persons in Marshallese Populations Having Thyroid Nodules (1979)

Group	Age < 18 in 1954			Age > 18 in 1954		
	No.	% with nodules	% with cancer	No.	% with nodules	% with cancer
Exposed in 1954						
Rongelap	42	52.4	4.8	44	15.9	4.5
Utirik	85	9.4	2.4	79	11.4	1.3
Comparison						
Rongelap	553	0.7	0.2	115	11.3	0.9
Utirik	435	1.4	0.2	38	7.9	2.6
Wotje	103	3.9	1.0	59	6.8	0.0
Likiep	102	1.0	0.0	90	4.4	0.0
Ailuk	156	5.0 (Est)	?	244	5.0 (Est)	?
Total	1339			546		

Prevalence of Thyroid Abnormalities Among Marshall Islanders 27 Years After Exposure to Fallout (1981)

Group & Age (1954) Exposed	Number of People	Original Dose (REM)	Updated Dose (REM)	Percent with Condition		
				Hypothyroid	Nodules	Cancer
Rongelap						
1 yr old	6	≥1500	640-4000	84	67	0
2-9 yrs	16	800-1500	4000	25	81	6
≥10 yrs	45	340-800	1300-1700	9	13	6
Alinginae						
< 10 yrs	7	280-450	1100	0	29	0
≥ 10 yrs	12	140-190	400-600	8	33	0
Utirik						
< 10 yrs	64	60-100	100-490	0	8	2
≥ 10 yrs	100	30-60	170-220	1	12	2
Unexposed Comparison						
< 10 yrs	229	--	NA	0.4	3	1
≥ 10 yrs	371	--	NA	0.3	8	1

Comparison of the 177 Health Care Program and the DOE Program					
Program	Population	How Many	Coverage	Who Pays	Who Administers
177 Health Care Program	Bikini, Enewetak, Rongelap, Utirik	About 11,470	All medical treatment needs	Congress at rate of $2M/year via DOI	Mercy International working for RMI
DOE Medical Program	Rongelap and Utirik exposed + comparison population	133 remain of original 253 exposed plus a 109 comparison group who get medical screening and acute care only	Twice yearly medical exams and medical treatment for all conditions that have potential to be radiogenic in origin	Special funds from Congress to DOE About $2.5M/yr	Brook-haven National Laboratory - DOE contractor